Denver Water's 2005 Treated Water Quality Summary Report

View of the State Capitol from Civic Center Park –
courtesy of Denver Metro Convention and Visitors Bureau

DENVER WATER

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Introduction

Denver Water provides its customers with high quality drinking water. We want you to be aware of how that quality is maintained and to feel comfortable with and be knowledgeable of the water treatment process and the care and effort that go into providing the Denver Metropolitan Area with water that meets the most stringent standards.

We prepared this report to provide you with important information about Denver's water quality. We want you to see why we have confidence in the quality of Denver's drinking water.

Explanation of Terms

To better understand this report, refer to the table below, it gives explanations of terms and measurement units that are used in the report:

Measurement Units Interpretation Table

Measurement Units Interpretation Table

Unit	Full Name	Equivalent to:
	General Terms	
SU	Standard Units (a measurement of pH)	
µS	Micro Siemens (a measurement of specific conductance)	Micro mhos
°C	Degrees Celsius (a measurement of temperature)	25°C ≈ (= approx.) 77°F (Fahrenheit)
	Chemical Terms	
mg/L	Milligrams per Liter	Parts per million (ppm)
µg/L	Micrograms per Liter	Parts per billion (ppb)
NTU	Nephalometric Turbidity Units (a measurement of turbidity)	
pCi/L	PicoCuries per Liter (a measurement of radioactivity)	50 pCi/L ≈ 4 mRem/yr
mRem/yr	Millirem per year (a measurement of radioactive dosage)	
AU	Absorbance units (a measurement of the absorbance at a specific wavelength)	
	Microbiological Terms	
CFU/100 ml	Colony forming units per 100 milliliters (a bacterial unit)	
Count/ml	Count of organisms per milliliter of sample (a bacterial unit)	

Report Data

This report includes graphs and tables summarizing data for samples collected throughout the year 2005 from the potable water leaving Denver Water's treatment plants (treated water). This report also includes some data from the plant influents (raw water). Results are expressed primarily as averages unless otherwise specified. The data tables that begin on page 18 give the MCL (Maximum Contaminant Level, the highest allowable level for a substance in drinking water) the average value, the range of values from the lowest to the highest for the year, and the number of samples tested (No.).

Parameters such as temperature and turbidity, are measurements of physical characteristics and are expressed in units specific to their analyses. Chemical results are generally expressed in terms of concentration, weight or amount per unit volume, e.g. mg/L or µg/L. Microbiological results are generally expressed in terms of a count of organisms per volume of sample, e.g. CFU/100 ml. For total coliform, the percent of positive samples each month is calculated and reported. The CDPHE (Colorado Department of Public Health and Environment) the primacy agency that enforces the EPA regulations in Colorado, states that no more than 5% of the samples may be positive per month.

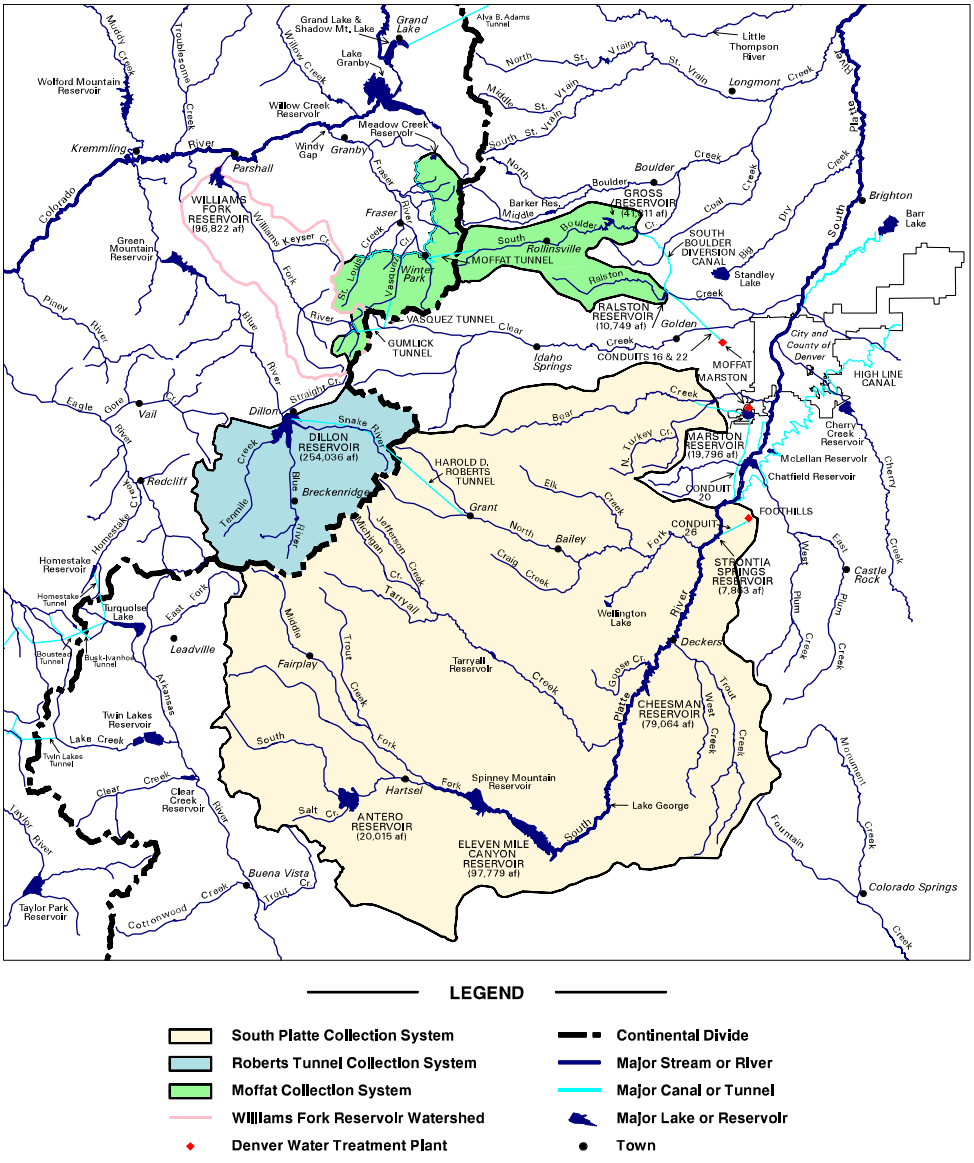
Treatment Plant Effluent and Distribution System
Total Coliform Samples for 2005

Month	Number of Samples	Number of Positives	% Positive
January	460	0	0.00%
February	438	0	0.00%
March	514	0	0.00%
April	478	0	0.00%
May	504	0	0.00%
June	501	1	0.20%
July	358	2	0.56%
August	426	0	0.00%
September	401	1	0.25%
October	433	0	0.00%
November	406	0	0.00%
December	379	0	0.00%
Totals	5,298	4	0.08%

Where Does Denver Get Its Water?

The South Platte collection system combines water from high mountain regions on the east slope of the Rocky Mountains with water diverted from Summit County and the Dillon collection system on the west slope of the Continental Divide. The Moffat collection system spans both sides of the Continental Divide, with the majority of it being located in Grand County on the west slope. Raw water from the Moffat collection system is sent through the Moffat Tunnel to facilities northwest of Denver for storage and treatment. Both sources provide high quality water, but their chemical characteristics are quite different. Also, the source water mineral concentration varies seasonally with the amount of flow. In general, the water in the South Platte system is moderately hard (has a higher mineral content) and the water in the Moffat system is soft (has a lower mineral content).

Water Collection System

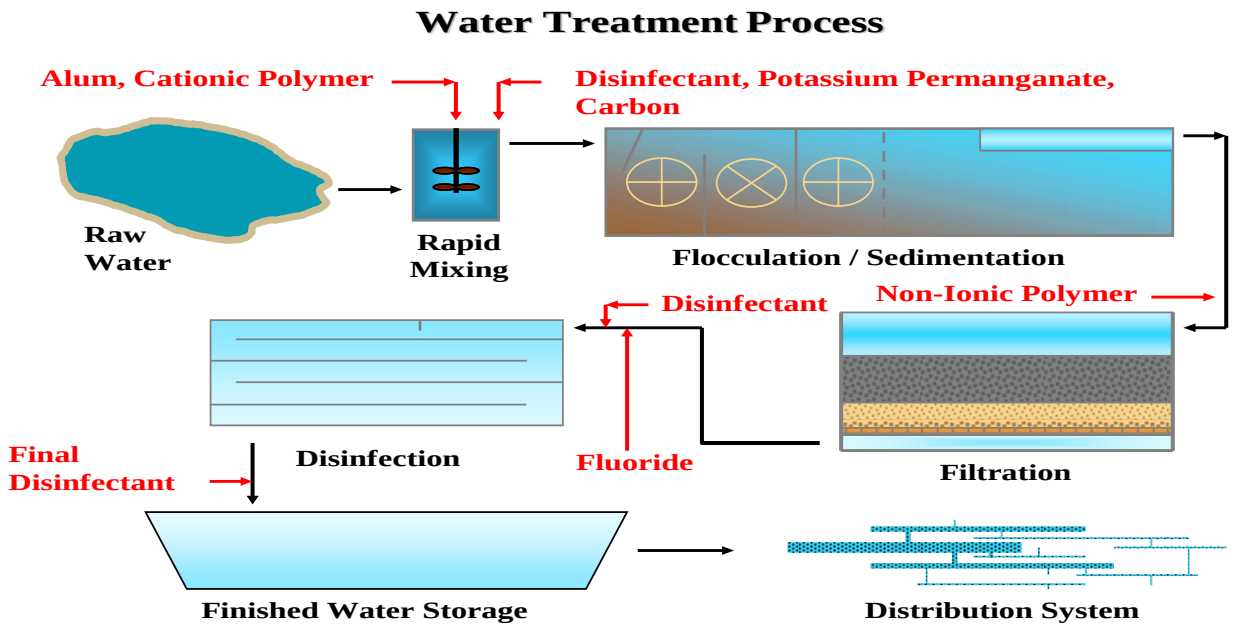


How Does Denver Make Drinking Water?

Denver Water has three treatment plants that process water collected from the areas shown above. Denver Water's three treatment plants have a combined maximum treatment capacity of 715 million gallons per day. Two treatment plants, Foothills and Marston, process water from the South Platte collection system. The third plant, Moffat treats water from the Moffat collection system.

The treatment process begins with the addition of "coagulants" to the raw water. These coagulants are commonly referred to as Alum and Polymer. Alum is aluminum sulfate a chemical that attracts 'dirt' and other particles in the water. Through a process of slow mixing, the particles collide and stick together to make them larger. The larger particles are called "floc". Polymer strengthens the floc making it easy to filter in later processes. These now larger particles settle to the bottom of the sedimentation basin and the clarified water at the top of the basin is then sent to silica sand filters at Moffat and sand and coal dual media filters for filtration at the other two plants. Filtration removes any of the particles carried over from the sedimentation process. Each treatment plant aims for extreme clarity of the water, evidenced by low turbidities (a measure of clarity). Less than 0.20 turbidity units is a measure of clear, clean water. Potassium Permanganate or Carbon may also be added to control excess manganese or odors, respectively.

After filtration, the water is sometimes supplemented to bring the total concentration of fluoride up to 0.90 mg/L. Caustic soda controls the pH, acidity/alkalinity of the water. It is added to adjust the pH of the water to between 7.5 S.U and 8.0 S.U. Finally, the water is thoroughly disinfected to maintain high quality water as it travels to your home or business. Foothills does not have a contact basin as displayed in the schematic below.



Why Is The Water Treated This Way?

The treatment train outlined above is designed to remove dirt, particulate matter, naturally occurring organic matter (NOM), and microscopic organisms like bacteria that may be in the raw water. Effective filtration is crucial in the removal of microorganisms, including bacteria that are associated with solids such as dirt and debris. Disinfection kills potentially harmful microorganisms. Disinfection of drinking water has saved millions of lives over the century by preventing waterborne diseases such as typhoid and cholera.

Denver Water uses a very effective long lasting disinfectant that produces fewer disinfection by-products (DBPs), such as Trihalomethanes (THMs) and Haloacetic Acids (HAAs).

The Environmental Protection Agency (USEPA) establishes the regulations for all water utilities. In Colorado, the state health department (CDPHE) is the agency that oversees and enforces these regulations for water utilities. These regulations are very strict and require that drinking water is made safe for consumption over a person's lifetime. At present there are over 85 contaminants and groups of contaminants that are regulated in drinking water. Some of these contaminants are clearly a threat, like lead, while others are merely suspected of being health risks, but still considered serious enough to regulate. EPA has set regulatory limits for these compounds. Regulatory limits are levels of safety that must not be exceeded in order to maintain safe drinking water. Some contaminants are regulated based on the possibility of their occurrence in water. Their regulatory limits or levels were determined based on the best available data from health studies. The majority of the EPA's drinking water regulations apply to treatment plant treated water (the finished water after treatment). We're happy to report that Denver Water has not violated any regulations to date. The compounds and elements that were **not** detected in any of the three treatment plants treated waters are listed on page 17.

How Well Is Denver Water Doing?

Denver Water has been very fortunate to have clean source water with which to start treatment. The table below illustrates the effectiveness of treatment for a few parameters of note.

As mentioned earlier turbidity is a measurement of the clarity of the water; thus a low turbidity indicates good water clarity. Most microorganisms including bacteria are attached to particulate matter, which accounts for much of the turbidity in water. Therefore, turbidity is an extremely important parameter and has been regulated by the EPA for many years. This regulation requires that turbidities in the treated water be less than or equal to 0.30 turbidity units, and 95% of the samples are not to exceed 1 NTU. For the last few years Denver Water has maintained plant effluent turbidities consistently less than 0.30 turbidity units.

Water hardness is relative, but in general, water with hardness above 12 grains per gallon is considered "hard" water. Hardness in water is an aesthetic quality and does not relate to the safety of the water. It relates to the mineral content of the water. When the mineral content of the water is higher, the water is harder. You may have noticed that in areas that have "hard" water, the ability to form soapsuds is lessened. Many customers inquire about the hardness of their water. The South Platte source has moderately hard water that varies seasonally from about 3 to less than 7 grains per gallon (gpg) of hardness. The Moffat source, on the other hand is very soft, with hardness in the range of about 1 to 3 gpg.

The total coliform test is a measure of all types of coliform bacteria in the water. Coliform bacteria are ubiquitous they are even found in soils and on plants. We test for coliform bacteria, which includes *E. coli,* which is found in the intestines of all mammals, including humans, to determine the cleanliness of the water. We test for total coliform in our plant's raw and treated waters, as well as throughout our entire distribution system. On the rare occasion when a sample has tested positive for total coliform, we must then test for *E. coli,* as well as resample and re-test not only the original site, but also up and downstream of it. If *E. coli* is detected in the treated water, public notification would be mandated, and we would isolate and correct the problem.

Average Values for 2005

Parameter	Treatment Plant	Raw Water Result	Finished Water Result
Turbidity (NTU)	Marston	1.72	0.06
Turbidity (NTU)	Foothills	5.95	0.05
Turbidity (NTU)	Moffat	2.84	0.04
Total Coliform (MPN/100 ml)	Marston	369	None detected
Total Coliform (MPN/100 ml)	Foothills	106	None detected
Total Coliform (MPN/100 ml)	Moffat	156	None detected

Are There More Serious Contaminants in the Water?

Denver Water has tested for all of the EPA regulated compounds for years and in anticipation of upcoming regulations, has tested for newly identified contaminants as well. Contaminants that have been seen in news headlines include lead, arsenic, mercury, *Cryptosporidium, Giardia,* and *E. coli* (*Escherichia Coli*) among others. Denver Water has tested for these for over 17 years and has not detected them in the treated water. *Giardia* and *Cryptosporidium* have occasionally been detected in the raw water, but the effective treatment system in our plants, as outlined on page 7, removes or inactivates these microorganisms.

Denver Water Average Values for 2005

Parameter	Treatment Plant	Raw Water Result	Treated Water Result
Lead (ppb)	Marston	None Detected	None Detected
Lead (ppb)	Foothills	None Detected	None Detected
Lead (ppb)	Moffat	None Detected	None Detected
Arsenic (ppb)	Marston	None Detected	None Detected
Arsenic (ppb)	Foothills	None Detected	None Detected
Arsenic (ppb)	Moffat	None Detected	None Detected
Mercury (ppb)	Marston	None Detected	None Detected
Mercury (ppb)	Foothills	None Detected	None Detected
Mercury (ppb)	Moffat	None Detected	None Detected

Denver Water Average Values for 2005

Parameter	Treatment Plant	Raw Water Result	Treated Water Result
Giardia (Cysts/L)	Marston	None Detected	None Detected
Giardia (Cysts/L)	Foothills	0.9	None Detected
Giardia (Cysts/L)	Moffat	None Detected	None Detected
Cryptosporidium (Oocysts/L)	Marston	None Detected	None Detected
Cryptosporidium (Oocysts/L)	Foothills	None Detected	None Detected
Cryptosporidium (Oocysts/L)	Moffat	None Detected	None Detected
E. Coli (MPN/100 ml)	Marston	5	None Detected
E. Coli (MPN/100 ml)	Foothills	2	None Detected
E. Coli (MPN/100 ml)	Moffat	<1	None Detected

Minerals In Nature That Are Found In Water

All natural waters contain 'minerals' from the earth. These mineral salts result from the natural erosion of soils, rocks and/or the decay of plants. The amounts of these minerals in water also determine the characteristics of the water, such as its hardness. Minerals in water give water its flavor. Mineral-rich water often tastes chalky or strong. Of the minerals shown above only barium and aluminum are regulated in the treated water. Barium has a MCL (maximum contaminant level) of 2,000 ppb, while aluminum has a SMCL (secondary MCL), which is a non-enforceable drinking water regulation of 50 — 200 ppb.

Denver Water Average Values for 2005

Parameter	Treatment Plant	Raw Water Result	Treated Water Result	EPA Regulatory Limit
Aluminum (ppb)	Marston	102	26	50 — 200
Aluminum (ppb)	Foothills	232	45	50 — 200
Aluminum (ppb)	Moffat	139	None Detected	50 — 200
Barium (ppb)	Marston	43	40	2,000
Barium (ppb)	Foothills	42	38	2,000
Barium (ppb)	Moffat	20	19	2,000
Calcium (ppm)	Marston	32.6	32	None
Calcium (ppm)	Foothills	27.5	28	None
Calcium (ppm)	Moffat	9.0	12	None

Denver Water Average Values for 2005

Parameter	Treatment Plant	Raw Water Result	Treated Water Result
Magnesium (ppm)	Marston	7.3	7.1
Magnesium (ppm)	Foothills	6.0	6.1
Magnesium (ppm)	Moffat	2.4	2.4
Potassium (ppm)	Marston	2.4	2.4
Potassium (ppm)	Foothills	2.1	2.1
Potassium (ppm)	Moffat	0.8	0.8
Sodium (ppm)	Marston	16.0	21.0
Sodium (ppm)	Foothills	12.4	17.0
Sodium (ppm)	Moffat	3.3	7.3

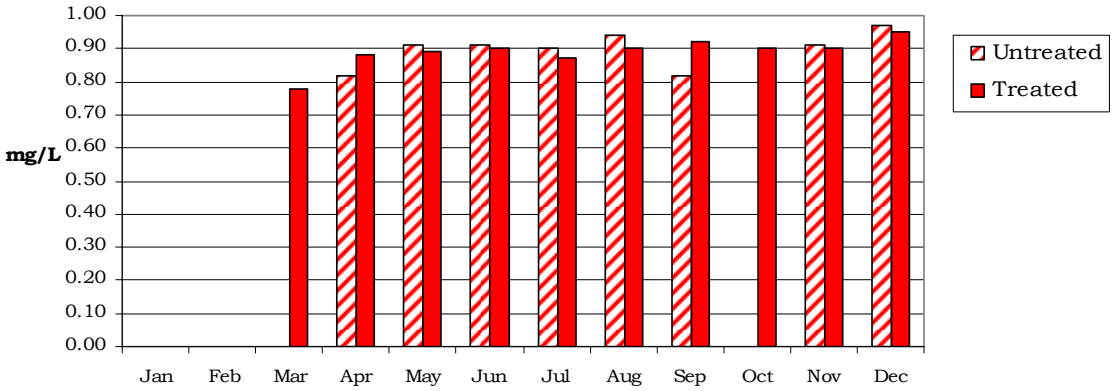
Most minerals are not removed by conventional treatment. Calcium, magnesium, iron and manganese amounts may be reduced by water treatment, but not completely removed. Please note that the comparisons above, though from the same treatment plants are not always from samples collected on the same dates for the raw and the finished waters, and therefore, are general comparisons. Drinking water naturally contains several minerals that are in fact beneficial to humans and mammals. The minerals in both of the tables above, are beneficial at prescribed levels. However, at levels above the regulatory limits (where applicable) some of these minerals may cause detrimental effects over a lifetime.

If there is no regulatory limit, or MCL, listed in the above tables, then the amount of the mineral that might cause a potential health concern is much higher than would ever be found in water. It would be a waste of time and resources to regulate it.

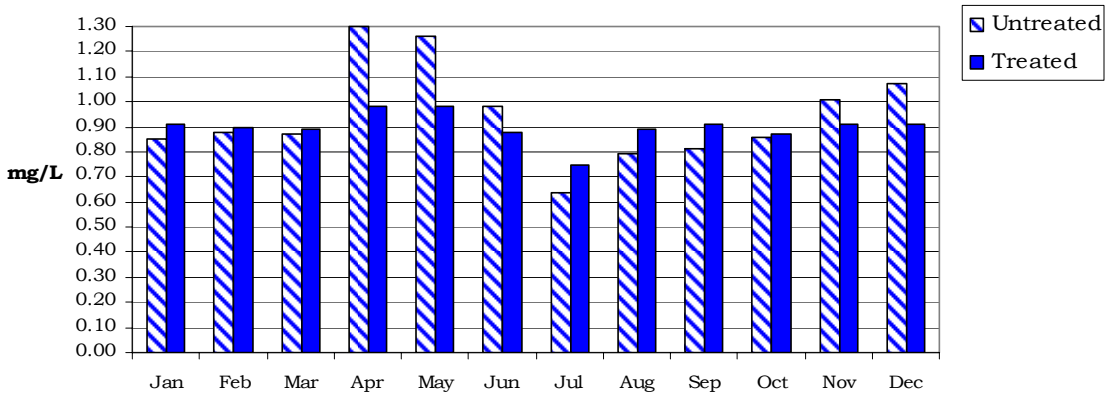
Fluoride is a naturally occurring substance. The amount of 0.90 mg/L in drinking water is considered ideal for helping to prevent tooth decay as determined by the American Dental Association. The Moffat source has lower amounts of fluoride and therefore must be fortified at the treatment plant up to the recommended 0.90 mg/L. All of our treatment plants can supplement fluoride. As you can see by the fluoride graphs on the next page with the exception of Moffat very little supplemental fluoride is needed to add to the naturally occurring fluoride in the water, and in some cases the natural fluoride levels are higher than 0.90 mg/L.

Comparison of Fluoride Between Raw And Treated Water

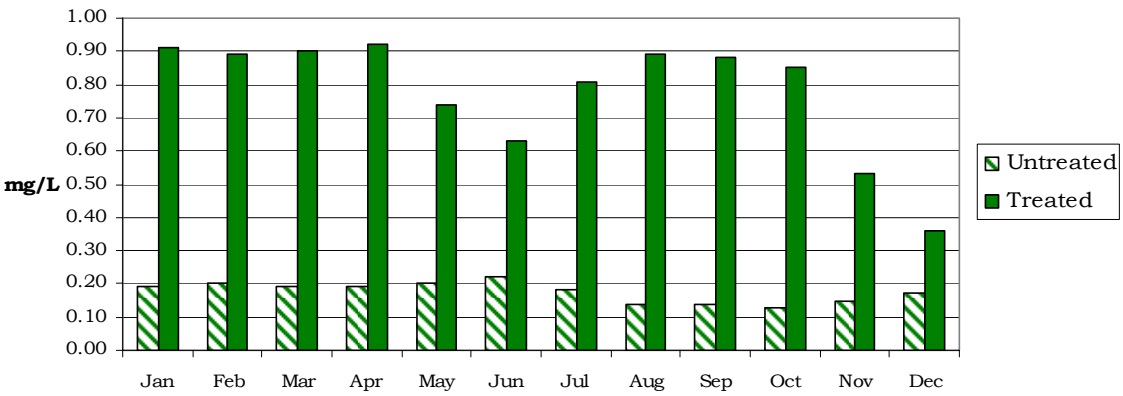
Monthly Average Fluorides
Marston Treatment Plant for 2005



Monthly Average Fluorides
Foothills Treatment Plant for 2005



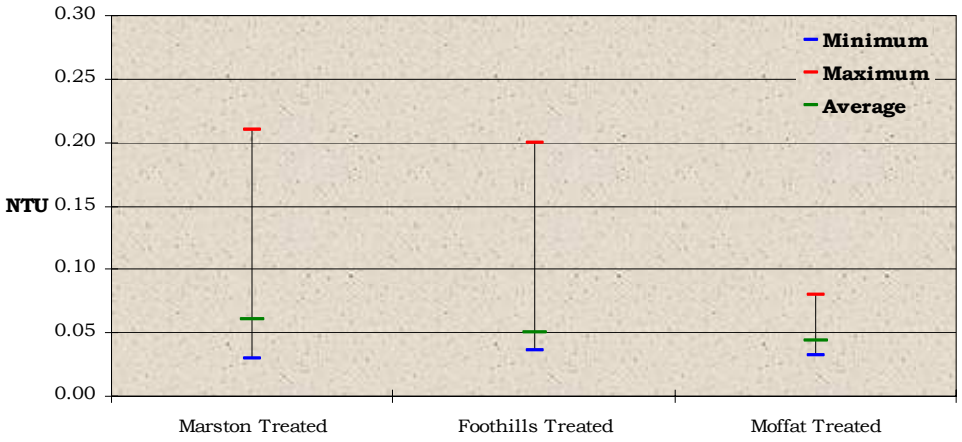
Monthly Average Fluorides
Moffat Treatment Plant for 2005



Turbidity and Hardness Graphs

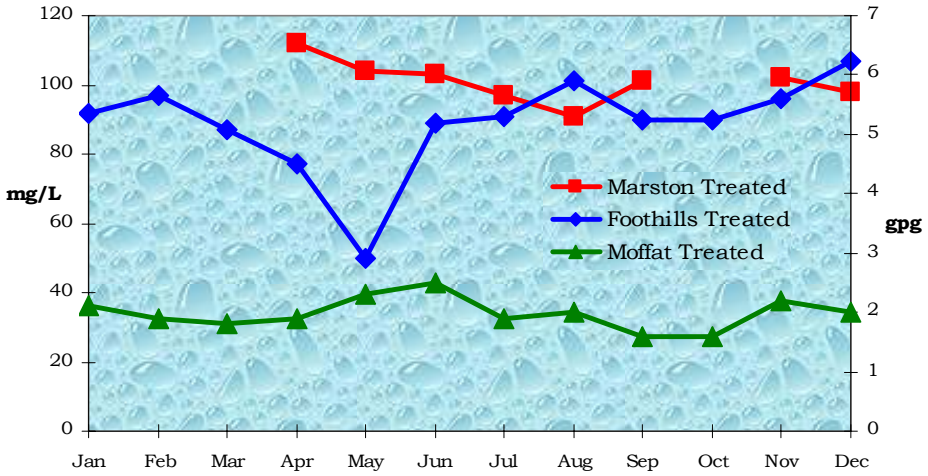
Turbidity refers to the clarity of the water. EPA has established a MCL for turbidity where at least 95% of the samples must be less than or equal to 0.30 Nephalometric Turbidity Units (NTU's) in the treatment plant effluents.

Turbidity Ranges of the Treated Water for 2005



Water hardness is a result of calcium and magnesium salts dissolved in water. High concentrations of these minerals make water "hard". There is no universal hardness scale for water. Generally, water hardness as Calcium Carbonate of less than 12 grains per gallon (gpg) is not considered hard. The South Platte source water is moderately hard, and varies seasonally between 3 to less than 7 gpg of hardness, while the Moffat source is soft, and varies seasonally between 1 to 3 gpg. Most customers calling about hardness are inquiring for detergent usage amounts, or adding tap water to their irons or humidifiers.

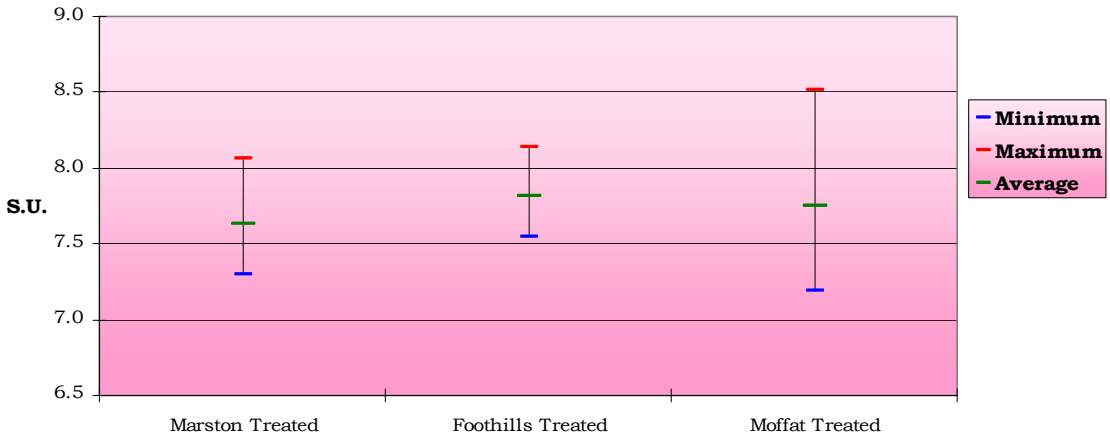
Monthly Hardness Values for Treated Water for 2005



pH and Temperature Graphs

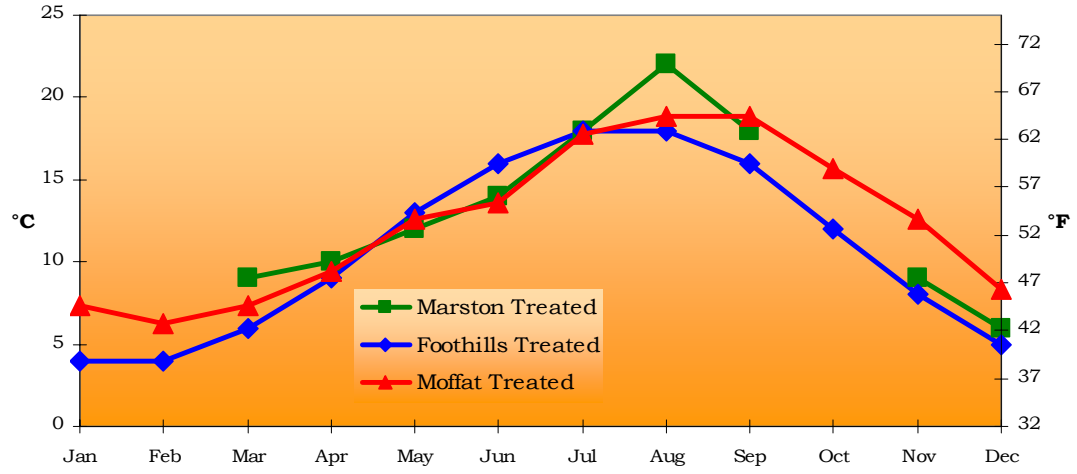
The pH range of the water is measured to ensure that the water is non-corrosive toward the water system's and residential plumbing. The pH of the water does not impact the safety of the water, it relates to the aggressiveness of the water towards pipe materials. Denver Water is required to maintain a pH in the Distribution System of 7.5 S.U or higher to ensure that the water does not leach potentially harmful metals from the pipes.

pH Ranges of the Treated Water for 2005



The water temperatures leaving the treatment plants fluctuate seasonally influenced by the temperatures of the flows from the mountain runoff, very cold in the winter and warmer in the summer. At higher temperatures, the disinfectant is more likely to dissipate allowing for bacterial re-growth. Chloramine residuals can be increased during the summer to ensure thorough disinfection. Breaks in the lines of the graphs indicate periods when the plants were not in service.

Average Monthly Temperatures of the Treated Water for 2005



Terms And Explanations

The tables on the next pages show the results for the treatment plant treated water tests. Either Denver Water's Water Quality Laboratory, or a contract laboratory performed these analyses during 2005.

Pages 18 through 23 are tables of data for compounds detected in our three treatment plant treated waters. The tables contain the name of the compound, the MCL (see below) where applicable, the average result, the range of detections for the year, and the number of times for which it was tested. Most of the compounds detected are not regulated and do not pose a health or safety risk.

Compounds that were not detected in Denver's water are listed on the next page. We test for all of these compounds and contaminants at least annually. Contaminants that have been in the news recently, such as lead, NDMA, and TCE, are on the list. Some of the abbreviations next to the contaminants on the next page are explained below.

AL—Action Levels are enforceable triggers for compliance that force public notification and treatment optimization.

MCL—Maximum Contaminant Level, the U.S. Environmental Protection Agency's (EPA's) drinking water regulatory limits. Based on health and toxicology studies, results at or below these levels in drinking water are considered safe. These are usually numeric values; sometimes they are designated as DS or TT (see below)

SMCL—Secondary Maximum Contaminant Level, the U.S. Environmental Protection Agency's non-enforceable, but recommended guideline level of a contaminant or compound. The exception to the rule is the fluoride SMCL of 2 mg/L that when exceeded triggers public notification.

DS—Distribution System is how the total coliform regulation is decreed. This means that the total coliform regulation (less than 5% total coliform positive samples per month) applies to the water in the distribution system (service area) not just the treatment plant effluents.

TT—Treatment Technique, refers to the water treatment process used in the treatment plants which must be optimized to control the levels of these contaminants, such as corrosion control. For example, the Lead and Copper Rule is regulated this way. The Lead and Copper Rule, specifically requires testing in a specified number of EPA defined "high risk" homes. EPA has defined "high risk" homes as older homes with lead plumbing or lead services and newer homes with copper pipe and lead based solder, built between 1982 and 1987. Lead solder was banned from domestic plumbing use in 1988. Homes built between the older ones and 1982 should have sufficient scale formation on the pipe walls to prevent contact with the plumbing thereby eliminating the possibility of lead from the plumbing leaching into the water. We not only test in these customer homes, but we also test the raw water, treated water and distribution system water for lead and copper. We have not detected lead in the raw, treated or distribution system water, and only small amounts of copper (less than a tenth of the regulatory limit) have been found.

Not Found In Denver's Drinking Water

Denver's water was analyzed for the following parameters. They were either not detected or the average result was less than the detection limits. The MCL is listed after the component in parenthesis where applicable. The unit of measure is also listed if different than that listed for the subsection. These potential contaminants are on EPA's nation-wide list of regulatory concerns.

General (mg/L)
Alkalinity, Phenolphthalein as $CaCO_3$
Chlorine, Free

Metals (mg/L)
Antimony (0.006)
Arsenic (0.05)
Beryllium (0.004)
Cadmium (0.005)
Chromium (0.1)
Cobalt
Copper (TT)
Iron
Lead (TT**1**)
Lithium
Mercury, Total (0.002)
Nickel (0.1)
Selenium (0.05)
Silver
Thallium (0.002)
Titanium
Vanadium
Zinc

Ions (mg/L)
Bromide
Cyanide, Total (0.2)
Nitrite-Nitrogen (1)
Ortho Phosphorus, Dissolved
Perchlorate

Radiological (pCi/L)
Radium-226, 228

Microbiological
Cryptosporidium
Giardia (TT**1**)
Plankton
Total Coliform (DS)

Disinfection By-Products (µg/L)
Bromodichloroacetic Acid
Bromoform
Carbon tetrachloride (5)
Chlorodibromoacetic acid
Dibromoactetonitrile
Monobromoacetic Acid
Monochloroacetic Acid
n-Nitrosodimethylamine (NDMA)
Trichloroacetonitrile

Organic Compounds (µg/L)
1,1,1,2-Tetrachloroethane
1,1,1-Trichloroethane (200)
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane (5)
1,1-Dichloroethene (7)
1,1-Dichloropropene
1-Chlorobutane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,3-Trimethylbenzene
1,2,4-Trichlorobenzene (70)
1,2,4-Trimethylbenzene
1,2,4,5-Tetrachlorobenzene
1,2-Dichloroethane (5)
1,2-Dichloropropane (5)
1,3,5-Trimethylbenzene
1,3-Dichloropropane
2,2-Dichloropropane
2,3-Dichlorobiphenyl
2-Butanone
2-Chlorobiphenyl
2-Chlorophenol
2-Hexanone
2-Methyl-4,6-dinitrophenol
2-Methylphenol
2-Nitrophenol
2-Nitropropane
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4,5-Trichlorobiphenyl
2,4,6-Trichlorophenol
4-Methyl-2-Pentanone
4-Chloro-3-methylphenol
4-Nitrophenol
Acetone
Acrylonitrile
Aldrin
Allyl chloride
Benzene (5)
Bromobenzene
Bromochloromethane
Bromomethane
Carbon disulfide
Chloroacetonitrile
Chlorobenzene (100)
Chloroethane
Chloromethane
cis-1,2-Dichloroethene (70)
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane (5)
Ethyl Benzene (700)
Hexachlorobutadiene
Hexachlorocyclopentadiene
Isopropyl Benzene
m-Dichlorobenzene
Methyl tert-butylether
Naphthalene
n-Butyl Benzene
Nitrobenzene
n-Propyl Benzene
o-Chlorotoluene
o-Dichlorobenzene (600)
p-Chlorotoluene
p-Dichlorobenzene (78.5)
p-Isopropyl Toluene
sec-Butyl Benzene
Styrene (100)
tert-Butyl Benzene
Tetrachloroethene (5)
Toluene (1000)
Toxaphene
trans-1,2-Dichloroethene (100)
trans-1,3-Dichloropropene
Trichloroethene
Trichloroethylene (5)
Trichlorofluoromethane
Vinyl Chloride (2)
Xylenes (10000)
1,2-Dibromo-3-chloropropane (0.2)
2,4,5-T
2,4-D (70)
2,4-DB
3,5-Dichlorobenzoic acid
3-Hydroxycarbofuran
4,4'-DDD
4,4'-DDE
4,4'-DDT
a-BHC
Acetochlor
Acifluourfen
Alachlor (2)
Aldicarb
Aldicarb sulfoxide
Aldicarb sulfone
Atraton
Atrazine (3)
Bentazon
β-BHC
Bromacil
Butachlor
Butylate
Carbaryl
Carbofuran
Chlordane
Chlorneb
Chlorobenzilate
Chlorothalonil
Chlorpropham
Cis-Permethrin
Cyanazine
Cycloate
Dacthal
Dalapon (200)
DCPA acid metabolites
δ-BHC
Diazinon
Dicamba
Dichlorprop
Dichlorvos
Dieldrin
Diethyl ether
Dimethoate
Diphenamid
Diquat
Dursban
Endothall (100)
Endosulfan –A
Endosulfan – B
Endosulfan sulfate
Endrin (2)
Endrin Aldehyde
Epichlorohydrin
EPTC
Ethoprop
Ethyl acrylate
Ethyl methacrylate
Ethyl tert-butyl ether
Ethylene dibromide
Etridiazole
Fenarimol
Fluridone
Glyphosate (700)
Heptachlor (0.4)
Heptachlor Epoxide (0.2)
Hexachloroethane
Hexazinone
Lindane
Malathion
Methacrylonitrile
Methylacrylate
Methylmethacrylate
Methiocarb
Methomyl
Methoxychlor
Methyl paraoxon
Metolachlor
Metribuzin
Mevinphos
Mirex
Molinate
Napropamide
n-Butyl acrylate
n-Nitrosodiethlyamine
n-Nitrosodi-n-butylamine
n-Nitrosodi-n-propylamine
n-Nitrosomethlyethylamine
n-Nitrosopiperidine
n- Nitrosopyrollidine
Oxamyl (200)
Paraquat
Parathion
Pebulate
Pentachloroethane
Pentachloronitrobenzene
Permethrin isomers
Phenol
Picloram (500)
Prometon
Prometryn
Pronamide
Propachlor
Propazine
Propionitrile
Propoxur
Silvex (50)
Simazine (4)
Simetryn
Stirofos
Terbacil
Terbuthiuron
Terbutryn
Tetrahydrofuran
trans-Permethrin
Triademefon
Tricyclazole
Trifluralin
Vernolate
Vinyl acetate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Acenaphthylene
Ametryn
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene (0.2)
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Bis(2-ethylhexyl)adipate (400)
Bis(2-ethylhexyl)phthalate
Butyl benzyl phthalate
Caffiene
Chrysene
Dibenzo(a,h)anthracene
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Fluoranthene
Fluorene
Hexachlorobenzene (1)
Indeno(1,2,3-cd)pyrene
Isophorone
Pentachlorobenzene
Pentachlorophenol (1)
Phenanthrene
Polychlorinated Biphenyls (0.5)
Pyrene

Data Tables For Treatment Plant Treated Water

Marston Treatment Plant Treated Water

Analysis	MCL	Average	Range	No.
General (mg/L)				
Alkalinity, Total as $CaCO_3$		56	26 - 66	8
Chlorine, Total		1.56	0.89 - 2.08	2,925
Hardness as $CaCO_3$		101	91 - 112	8
pH (SU)		7.64	7.3 - 8.06	2,921
Specific Conductance (µS)		315	270 - 360	80
Temperature (°C)		12	6 - 22	80
Total Dissolved Solids		167	82 - 189	8
Turbidity (NTU)	TT	0.06	0.03 - 0.21	2,923
Metals (µg/L)				
Aluminum, Available (mg/L)		0.04	0.02 - 0.06	4
Aluminum		26	<20 - 43	8
Barium	2,000	40	38 - 44	8
Boron		17	12 - 20	8
Calcium (mg/L)		32	29 - 35	8
Magnesium (mg/L)		7.1	6.2 - 8.2	8
Manganese		4	<2 - 6	8
Molybdenum		20	17 - 25	8
Potassium (mg/L)		2.4	2.2 - 2.5	8
Sodium (mg/L)		21	18 - 23	10
Strontium (mg/L)		0.20	0.18 - 0.21	2
Zinc		<6	<6 - <6	8
Ions (mg/L)				
Chloride		21.0	18.5 - 23.1	7
Fluoride	4.0	0.90	0.66 - 1.20	985
Nitrate-Nitrogen	10	0.11	0.08 - 0.14	2
Silicon		2.1	0.7 - 3.6	8
Sulfate		58.7	52.1 - 67.2	7

Marston Treatment Plant Treated Water

Analysis	MCL	Average	Range	No.
Radiological (pCi/L)				
Beta, Total		4	<2 - 9	3
Uranium (µg/L)	30	<0.3	<0.3 - 0.3	8
Microbiological				
Heterotrophic Plate Count (CFU/mL)		0.25	0.02 - 1.3	23
Disinfection By-Products (µg/L)				
1,1,1-Trichloropropanone		2.0	1.7 - 2.4	2
1,1-Dichloropropanone		1.2	1.2 - 1.2	2
Bromochloroacetic acid		3.3	2.8 - 3.8	8
Bromochloroacetonitrile		1.2	1.1 - 1.3	2
Bromodichloromethane		8.0	6.0 - 12.7	7
Chloral hydrate		1.2	0.7 - 2.1	7
Chloroform		9.9	6.4 - 19.1	7
Chloropicrin		<0.4		
Cyanogen Chloride		2.5	2.2 - 2.7	2
Dibromoacetic acid		1.1	0.8 - 1.2	8
Dibromoacetonitrile		0.5	0.5 - 0.5	2
Dibromochloromethane		3.7	2.7 - 6.1	7
Dichloroacetic acid		6.8	5.0 - 8.5	8
Dichloroacetonitrile		1.6	1.6 - 1.7	2
Haloacetic Acids (5)	60	12	9 - 16	8
Total Trihalomethanes	80	22	15 - 38	7
Trichloroacetic acid		4.4	3.3 - 6.5	8
Non-Specific Organics				
Total Organic Carbon (mg/L)	TT	2.2	1.3 - 3.7	34
Total Organic Halogen (µg/L)		155	na	1

Foothills Treatment Plant Treated Water

Analysis	MCL	Average	Range	No.
General (mg/L)				
Alkalinity, Total as $CaCO_3$		52	44 - 60	12
Chlorine, Total		1.50	1.16 - 1.99	4,270
Hardness as $CaCO_3$		89	50 - 107	12
pH (SU)		7.82	7.54 - 8.14	4,270
Specific Conductance (µS)		255	180 - 320	135
Temperature (°C)		9	3 - 19	135
Total Dissolved Solids		161	115 - 179	12
Turbidity (NTU)	TT	0.05	0.04 - 0.20	4,272
Metals (µg/L)				
Aluminum, Available (mg/L)		0.04	<0.02 - 0.09	5
Aluminum		45	23 - 93	12
Barium	2,000	38	31 - 41	12
Boron		13	9 - 18	12
Calcium (mg/L)		28	18 - 32	12
Copper	TT	<6	<6 -<6	12
Magnesium (mg/L)		6.1	4.4 - 7.7	12
Manganese		3	<2 - 13	12
Molybdenum		20	<3 - 40	12
Potassium (mg/L)		2.1	1.5 - 2.3	12
Sodium (mg/L)		17	14 - 20	14
Strontium (mg/L)		0.14	0.11 - 0.18	2
Zinc		<6	<6 - <6	12
Ions (mg/L)				
Chloride		17.6	12.6 - 20.4	11
Fluoride	4.0	0.90	0.46 - 1.20	2,099
Nitrate-Nitrogen	10	0.26	0.19 - 0.36	3
Silicon		3.8	3.1 - 5.2	12
Sulfate		49.7	33.0 - 60.0	11

Foothills Treatment Plant Treated Water

Analysis	MCL	Average	Range	No.
Radiological (pCi/L)				
Beta, Total		2	<2 - 3	4
Uranium (µg/L)	30	<0.3	<0.3 - 0.8	12
Microbiological				
Heterotrophic Plate Count (CFU/mL)		0.20	0.01 - 3.1	34
Disinfection By-Products (µg/L)				
1,1,1-Trichloropropanone		2.3	1.4 - 4.0	4
1,1-Dichloropropanone		1.1	<5 - 2.5	5
Bromochloroacetic acid		2.8	2.3 - 3.5	9
Bromochloroacetonitrile		0.8	0.7 - 1.1	4
Bromodichloromethane		8.4	6.6 - 10.3	19
Chloral hydrate		2.2	1.0 - 4.1	11
Chloroform		22.0	9.3 - 39.9	19
Chloropicrin		0.4	<0.4 - 1.1	4
Cyanogen Chloride		2.8	2.0 - 3.6	2
Dibromoacetic acid		<0.5	<0.5 - 0.7	9
Dibromochloromethane		1.6	<0.5 - 2.9	19
Dichloroacetic acid		11.8	5.6 - 20.3	9
Dichloroacetonitrile		2.8	2.0 - 4.2	4
Haloacetic Acids (5)	60	24	12 - 40	9
Total Trihalomethanes	80	32	18 - 50	19
Trichloroacetic acid		11.8	6.0 - 19.2	9
Non-Specific Organics				
Total Organic Carbon (mg/L)	TT	1.9	1.3 - 3.2	49
Total Organic Halogen (µg/L)		288	na	1

Moffat Treatment Plant Treated Water

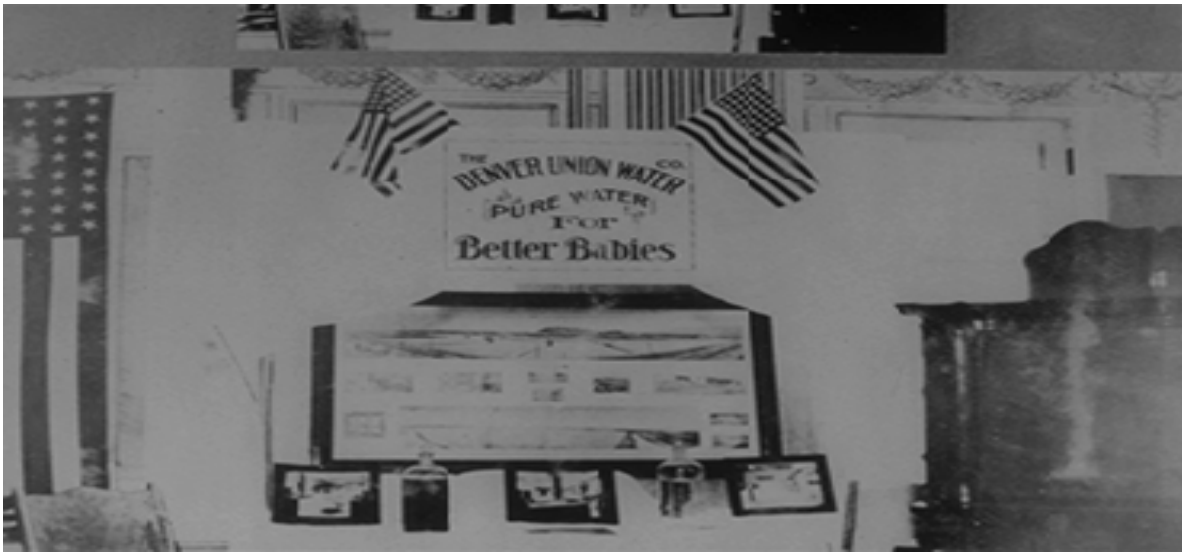
Analysis	MCL	Average	Range	No.
General (mg/L)				
Alkalinity, Total as $CaCO_3$		23	18 - 29	12
Chlorine, Total		1.53	0.92 - 2.16	3,806
Hardness as $CaCO_3$		34	27 - 42	12
pH (SU)		7.75	7.19 - 8.52	1,898
Specific Conductance (µS)		111	70 - 150	121
Temperature (°C)		10	6 - 19	121
Total Dissolved Solids		66	50 - 82	12
Turbidity (NTU)	TT	0.04	0.03 - 0.08	3,803
Metals (µg/L)				
Aluminum, Available (mg/L)		<0.02	<0.02 - <0.02	6
Aluminum		<20	<20 - 63	12
Barium	2,000	19	16 - 24	12
Boron		5	4 - 7	12
Calcium (mg/L)		12	10 - 14	12
Magnesium (mg/L)		2.4	1.9 - 3.2	12
Manganese		<2	<2 - 5	12
Molybdenum		<3	<3 - <3	12
Potassium (mg/L)		0.8	0.7 - 1.0	12
Sodium (mg/L)		7.3	3 - 10	14
Strontium (mg/L)		0.058	0.040 - 0.077	2
Ions (mg/L)				
Chloride		4.6	2.9 - 8.7	11
Fluoride	4.0	0.86	0.12 - 1.18	1,888
Nitrate-Nitrogen	10	0.08	0.05 - 0.13	3
Silicon		3.3	2.7 - 4.2	12
Sulfate		18.6	7.8 - 23.3	11

Moffat Treatment Plant Treated Water

Analysis	MCL	Average	Range	No.
Radiological (pCi/L)				
Beta, Total		<2	<2 - 4	4
Uranium (µg/L)	30	<0.3	<0.3 - 1.1	12
Microbiological				
Heterotrophic Plate Count (CFU/mL)		0.15	0.01 - 2.2	33
Disinfection By-Products (µg/L)				
1,1,1-Trichloropropanone		2	1 - 2	3
1,1-Dichloropropanone		0.7	0.5 - 0.9	3
Bromochloroacetic acid		1.0	0.6 - 2.2	9
Bromochloroacetonitrile		<0.2	<0.2 - 0.2	3
Bromodichloromethane		2.0	1.1 - 3.3	11
Chloral hydrate		0.9	0.5 - 1.5	11
Chloroform		12.2	7.5 - 17.8	11
Chloropicrin		<0.4	<0.4 - <0.4	3
Cyanogen Chloride		3.4	2.2 - 4.7	2
Dibromoacetic acid		<0.5	<0.5 - 0.6	9
Dibromochloromethane		<0.2	<0.2 - 0.4	11
Dichloroacetic acid		8.5	4.5 - 13.3	9
Dichloroacetonitrile		1.5	1.2 - 1.7	3
Haloacetic Acids (5)	60	15	8 - 24	9
Total Trihalomethanes	80	13	8 - 20	20
Trichloroacetic acid		6.5	3.8 - 10.6	9
Non-Specific Organics				
Total Organic Carbon (mg/L)	TT	1.5	1.0 - 2.3	45
Total Organic Halogen (µg/L)		303	n/a	1

Looking Down The Road

What does the future hold in terms of water treatment and drinking water? As with other utilities around the country, Denver Water is updating its treatment plants and exploring new treatments and techniques to optimize treatment in preparation for upcoming regulations and greater protection from contaminants in the future.



From early in the 20th Century, water quality has always been important to Denver Water, as evidenced by the photo above. Water quality remains of paramount importance to us, as part of ensuring high quality drinking water, protection of the source water is vital. In an effort to protect the source water, the sedimentation dam below was built after the Hayman fire three years ago. The picture below shows the Goose Creek sediment trap dam above Cheesman Reservoir which was built to catch the sediment from storm runoff before it reaches the reservoir. The photo on the opposite page shows some recovery from the fire in the Cheesman area in 2005.

Report prepared by:
Maria Rose, Denver Water
Water Quality Laboratory

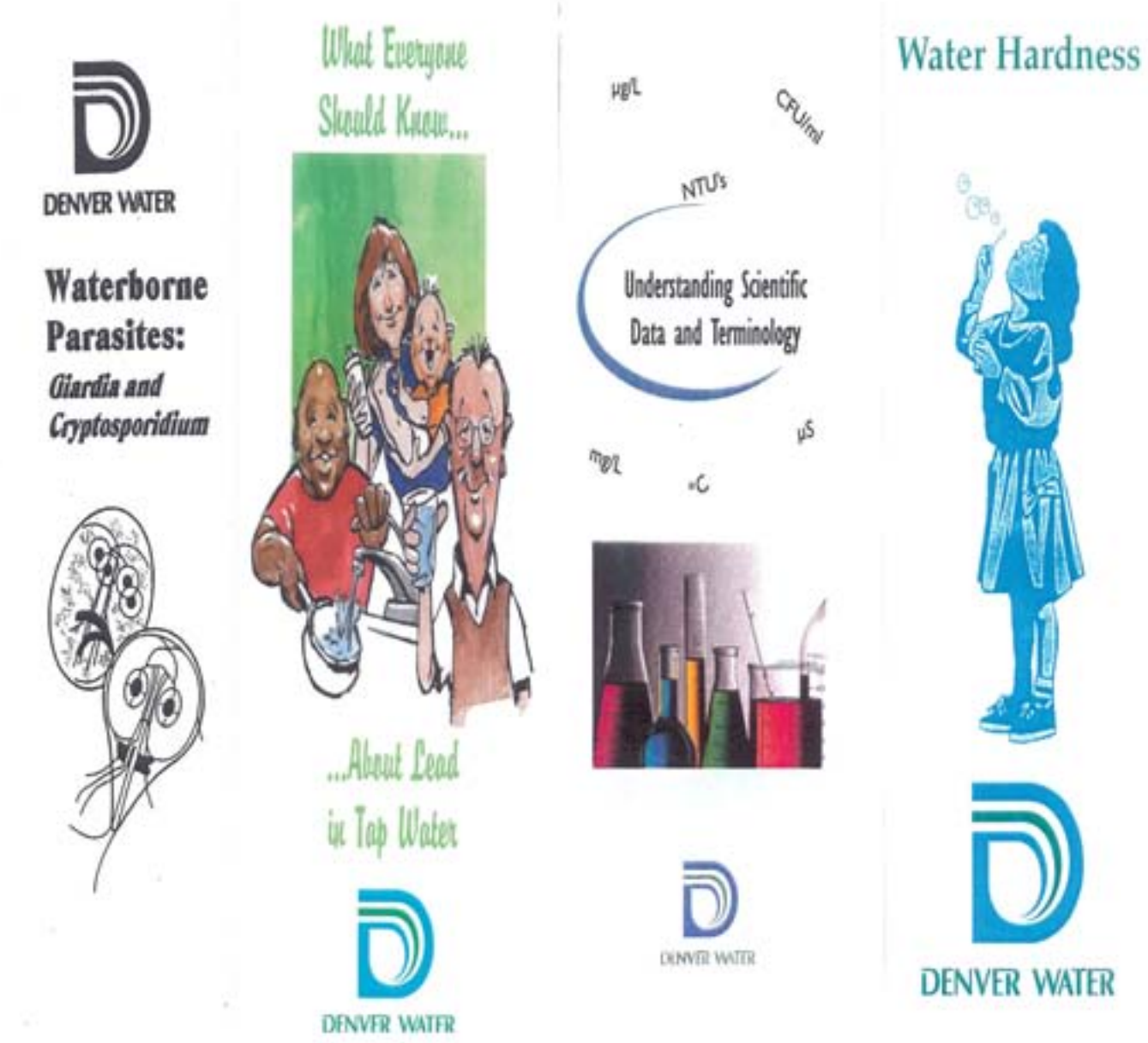
We will continue to remain vigilant for impacts and effects of the low water levels on our drinking water treatment and system. The precipitation for Fall/Winter 2005 into 2006 was a little above average and consequently filled some of our reservoirs that had been drastically affected by the drought of the last few years. It is too soon to determine whether or not we are recovering from the drought or if we just had a single wet year.

Below is a picture of the Cheesman Dam spillway to the South Platte River taken in 2005. See the map on page 6.

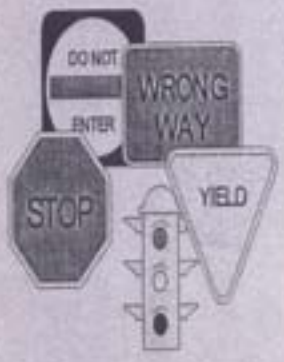
Many new challenges await us in the drinking water industry. We are our own customers; and we have a stake in making sure that the water is safe for all of us. We are also environmental scientists and we care about the preservation of our watershed and the natural beauty that surrounds it. Though we have caretakers who live near our mountain reservoirs and monitor them, customers help with this effort and we appreciate it. We are committed to meeting your water needs by continuing to provide high quality drinking water and excellent service. If you have a water quality concern or just have questions, or comments regarding water quality, give us a call at 303-893-2444.

Water Quality Brochures

Below and on the next page are brochures that are available from Denver Water's Water Quality Section.
Just call 303-628-5996 to have a copy mailed to you.



DENVER WATER



A WATER QUALITY WARNING ABOUT CROSS CONNECTIONS

Fluoride,

In the drinking water?

DENVER WATER

What to do if ...

DENVER WATER

Taste and Odor in Drinking Water

Denver Water is committed to serving water which is aesthetically pleasing, in addition to meeting regulatory requirements. But some customers perceive objectionable tastes or odors, from time to time, in their drinking water.

This pamphlet gives information concerning common taste and odor (T&O) issues, and discusses how you can make sure your drinking water is pleasant to drink.

Denver Water's 2005 Treated Water Quality Summary Report

Denver Water's Water Quality Laboratory
6100 W. Quincy Avenue
Denver, CO 80235

Phone: 303-628-5996
Fax:303-795-2495
Email: maria.rose@denverwater.org